PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-155962

(43)Date of publication of application : 17.06.1997

(51)Int.Cl. B29C 49/78
B29C 49/04
B29C 49/16
B29C 49/22
// B29L 22:00

(21)Application number : 07-315541

(22)Date of filing : 04.12.1995

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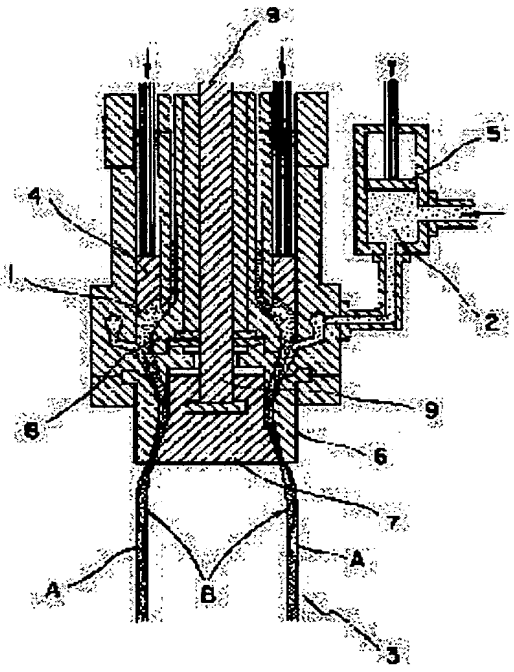
(54) MULTILAYER BLOW MOLDING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To form a multilayer blow molded item having low occurrence of flashes and having a good appearance by reducing the unevenness and thinning of wall thickness.

SOLUTION: This molding method is such that various kinds of molten resin are extruded as cylindrical multilayer parisons into a split mold to mold a molded item by blowing compressed air therein. In this case, at least one layer of multilayer parisons is formed of a high resistant force material (refer as material A hereinafter) to the stretching during the melting period of time, and at least another layer is formed of a low resistant force material (refer as material B hereinafter) relative to the stretching during the melting period of time, and by permitting the wall thickness ratio between the material A layer and material B layer to be varied, the distribution of the wall thickness is controlled in each part of the molded item having different degrees of the stretching. In addition to obtaining a molded item with the uniform wall thickness distribution, the ability of the article required can be achieved at a lower limited weight with the result that the occurrence of flashes is reduced.



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CLAIMS

[Claim(s)]
[Claim 1] In the blow molding method for breaking two or more sorts of melting resin as multilayer cylinder-like parison from the die head for co-extrusion blow molding, extruding into metal mold, and obtaining mold goods by the mold clamp of metal mold, and the pressurization Ayr entrainment At least one layer of this multilayer parison is formed from high melt viscosity or the ingredient (it considers as Ingredient A below) which has high drag force to expanding at the time of melting. While forming other at least one layer from melt viscosity lower than it or the ingredient (it considers as Ingredient B below) which has low drag force to expanding at the time of melting The ingredient configuration of the direction of a knockout of the above-mentioned multilayer parison, and/or a hoop direction The multilayer blow molding approach characterized by controlling thick distribution of each part of mold goods from which an extension degree differs by changing the ratio of wall thickness to outside diameter of an ingredient A horizon and an ingredient B horizon according to the extension degree of the parison at the time of parison deforming into a mold-goods configuration by the blow up within metal mold.
[Claim 2] In the field which an extension degree will be large and will tend to carry out thinning if it is the case of the monolayer parison of homogeneity thickness, change of the ratio of wall thickness to outside diameter of an ingredient A horizon and an ingredient B horizon In the field which is large in the ratio of wall thickness to outside diameter of an ingredient A horizon, and makes small relatively the ratio of wall thickness to outside diameter of an ingredient B horizon, and the extension degree tends to make heavy-gage small conversely The multilayer blow molding approach according to claim 1 characterized by being what changes the thickness ratio of each ingredient A horizon / ingredient B horizon to 1000:1-1:1000 so that it may be small in the ratio of wall thickness to outside diameter of an ingredient A horizon and the ratio of wall thickness to outside diameter of an ingredient B horizon may be enlarged relatively.
[Claim 3] While changing the relative ratio of wall thickness to outside diameter of an ingredient A horizon and an ingredient B horizon according to the extension degree which the direction of extrusion of multilayer parison and/or a hoop direction deform The thickness of this multilayer parison in furthermore, the range in which the extension gap of each part generated by change of the ratio of wall thickness to outside diameter of Ingredient A and a B horizon is not offset The multilayer blow molding approach according to claim 1 or 2 characterized by making it change so that it may become thin in the field which is thick in the field in which an extension degree is equivalent to a large part, and is equivalent to a part with a small extension degree, and making thick distribution of the whole blow molding article into homogeneity.
[Claim 4] The multilayer blow molding approach according to claim 1 characterized by performing the mold clamp of metal mold, and a pressurization Ayr entrainment where it carried out reserve blowing in (PURIBURO) until it became the configuration approximated to the profile of the mold goods formed of ******** of metal mold, and the depth of a metal mold cavity, and internal pressure is maintained inside parison.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the multilayer blow molding approach of having made thickness deviation especially with a good and local product appearance, and thinning easing, about the multilayer blow molding approach.
[0002]
[Description of the Prior Art] Generally in the blow molding method, generating of the thickness deviation accompanying deforming into various mold goods from cylindrical parison and weld flash has been a technical problem. As for the sealing engine performance to transparency of the contents which are an impact, the mechanical strength of a blow molding article to deformation by the pressure, and a function as a container etc., the engine performance falls most in a thin part with a thick blow molding article. As compared with other parts, it is easy to carry out the thinning especially of the corner (a part for a corner) of mold goods, and it is based on a configuration, and it is not new that the thick difference for a heavy-gage part and a thin-walled part becomes several times, either. For this reason, when it is going to satisfy the engine performance for which a product is asked, by raising the thickness for the thin-walled part generated at the time of shaping, other parts make it heavy-gage beyond the need, and weight increases. For this reason, since the time amount which cooling takes by making it heavy-gage also becomes long in addition to ingredient cost becoming high, a molding cycle becomes long and is uneconomical. Then, in order to make the minimum thickness of mold goods the same, a die and the lip path clearance of a nozzle are changed, or it is unstated about applying an extrusion rate to thick control of multilayer parison by adjustment of a frog etc., although the parison controller (plastics age and 32[4] P.173~179 (1986) reference) which carries out sequence control of the thickness of monolayer parison is well-known.
[0003] In addition, various approaches are proposed in order to ease local thinning. For example, the approach of controlling the thickness of each part by JP,5-254003,A by changing the pressure of PURIBURO which divides parison into two or more air space, and is blown into each air space, and adjusting the draw ratio for every air space contacts this part to parison in advance of an entrainment by making the corner part of metal mold into slide core structure by JP,3-297622,A again, and the approach of retreating with expansion of parison is indicated. Moreover, in JP,2-70419,A, the policy which gives change to the diameter of parison of each part is indicated using the gap of a die swell ratio (ratio of the outer diameter of parison and the outer diameter of a die which are extruded from a die).
[0004]
[Problem(s) to be Solved by the Invention] However, since the boundary of pinch marks or a dissimilar material, the trace of division of metal mold, etc. occur in the appearance of a product, no these are suitable for exterior parts. moreover, blow molding -- setting -- weld flash -- generating -- production -- each time -- this -- grinding and virgin material -- mixing -- reusing . However, the thing little as much as possible of the amount to mix needs to be desirable, and it is necessary to decrease the yield of weld flash itself for that purpose from the heat deterioration of an ingredient advancing. This invention aims at easing local thickness deviation and thinning and the appearance of a product obtaining a good multilayer blow molding article also with few yields of weld flash especially, in view of the above point.
[0005]
[Means for Solving the Problem] Then, in order to solve the above-mentioned technical problem, as a result

of examining many things, one layer of the ingredient of the layer which constitutes multilayer parison is used as the ingredient (ingredient A) which has high drag force to expanding at the time of melting. As an ingredient configuration which consists of the ingredient (ingredient B) which has drag force lower than the former to expanding at the time of melting rather than this, other at least one layer In the field equivalent to the part in which mold goods tend to carry out thinning, header this invention was completed for it being effective to use the multilayer parison which enlarged the ratio of wall thickness to outside diameter of Ingredient A, and adjusted small the ratio of wall thickness to outside diameter of Ingredient B.

[0006] Namely, claim 1 of this invention breaks two or more sorts of melting resin as multilayer cylinder-like parison from the die head for co-extrusion blow molding, and extrudes it into metal mold, and it sets by the blow molding method for obtaining mold goods by the mold clamp of metal mold, and the pressurization Ayr entrainment. At least one layer of this multilayer parison is formed from high melt viscosity or the ingredient (it considers as Ingredient A below) which has high drag force to expanding at the time of melting. While forming other at least one layer from melt viscosity lower than it or the ingredient (it considers as Ingredient B below) which has low drag force to expanding at the time of melting The ingredient configuration of the direction of a knockout of the above-mentioned multilayer parison, and/or a hoop direction It is the multilayer blow molding approach characterized by controlling thick distribution of each part of mold goods from which an extension degree differs by changing the ratio of wall thickness to outside diameter of an ingredient A horizon and an ingredient B horizon according to the extension degree of the parison at the time of parison deforming into a mold-goods configuration by the blow up within metal mold.

[0007] Claim 2 of this invention moreover, change of the ratio of wall thickness to outside diameter of the above-mentioned ingredient A horizon and an ingredient B horizon In the field which an extension degree will be large and will tend to carry out thinning if it is the case of the monolayer parison of homogeneity thickness In the field which enlarges the ratio of wall thickness to outside diameter of an ingredient A horizon, and makes small relatively the ratio of wall thickness to outside diameter of an ingredient B horizon, and the extension degree tends to make heavy-gage small conversely It is small in the ratio of wall thickness to outside diameter of an ingredient A horizon, and is characterized by being what changes the thickness ratio of each ingredient A horizon / ingredient B horizon to 1000:1-1:1000 so that the ratio of wall thickness to outside diameter of an ingredient B horizon may be enlarged relatively.

[0008] Moreover, while claim 3 of this invention changes the relative ratio of wall thickness to outside diameter of an ingredient A horizon and an ingredient B horizon according to the extension degree which the direction of extrusion (upper and lower sides) of multilayer parison and/or a hoop direction deform The thickness of this multilayer parison in furthermore, the range in which the extension gap of each part generated by change of the ratio of wall thickness to outside diameter of Ingredient A and a B horizon is not offset In the field in which an extension degree is equivalent to a large part, it is thick and is characterized by making it change so that an extension degree may become thin in the field equivalent to a small part, and making thick distribution of the whole blow molding article into homogeneity. Furthermore, claim 4 of this invention breaks multilayer parison, and is under descent or in the condition which hung into metal mold again. Also when performing reserve blowing in (PURIBURO) of pressurization Ayr until it becomes the configuration approximated to the profile of the mold goods formed of ******** of metal mold, and the depth of a metal mold cavity, by adjusting the ratio of wall thickness to outside diameter of Ingredient A and a B horizon It is characterized by controlling thick distribution of the whole mold goods to homogeneity, maintaining the configuration approximated to the profile.

[0009] This invention is explained to a detail below. As a die head for co-extrusion blow molding which forms the multilayer parison of this invention, both the continuous extrusion-type co-extrusion die for multilayers and the accumulator type multilayer co-extrusion die of an intermittent extrusion type are usable. Moreover, the resin layer which forms multilayer parison forms at least one layer from high melt viscosity or the ingredient (it considers as Ingredient A below) which has high drag force to expanding at the time of melting, and forms other at least one layer from melt viscosity lower than it or the ingredient (it considers as Ingredient B below) which has low drag force to expanding at the time of melting, and the parison which consists of two-layer [this] tends to use it. In addition, you may be the parison which consists of a multilayer of the 3rd more than layer from which a resin kind differs further. However, the

fixed thing of the layer [3rd / more than] layer in this case it is supposed that it is thick is desirable.
[0010] Moreover, the resin kind of Ingredients A and B may be resin of the same class and the same network which carries out melting adhesion chemically only by the drag force to expanding differing by molecular weight and the molecular structure, the existence of additives, such as a filler, etc. at this point that what is necessary is just that from which the drag force to expanding in a melting time differs. Or you may be heterogeneous resin which is not pasted up chemically. If in charge of selection of the ingredients A and B of this invention, it is desirable as extent of the strength of drag force to expanding in the melting time of an ingredient that measurement of melting tension (unit: Newton) and measurement of MFR (unit; for g / 10 minutes) determine.
[0011] Melting tension is the value of the tension (unit: Newton) when making the fused resin into the shape of a strand here, for example, it can measure using the KYAPI Log rough Made from an Oriental energy machine. With this equipment, it rolls round with the taking over roll which rotates the resin of the shape of a strand extruded by fixed speed from the capillary (dimension : die length / diameter =10 / 1mm/ (mm)) at a fixed rate, and the tension of the strand at this time is measured as a load concerning a tension pulley. In this case, it is desirable that a melting tension value uses the thing of 0.15-0.5N (Newton) within the limits as Ingredient A. Moreover, as an ingredient B, it is desirable that a melting tension value uses the thing of 0.05-0.15N (Newton) within the limits as Ingredient B.
[0012] Moreover, MFR is the weight (unit; for g / 10 minutes) at the time of making it flow out of the die which had a regular dimension in a constant pressure, constant temperature, and fixed time amount (for 10 minutes) with the melt indexer specified by JIS, generally resin with the larger value of MFR has a better fluidity at the time of melting, and the drag force to expanding is small. Therefore, generally the value of MFR is low resin of drawdown nature, 0.5 especially or less, when small, and when [1 or less and], and considering as Ingredient A is desirable. It is desirable that it is generally high resin of drawdown nature, and considers as Ingredient B on the other hand when the value of MFR is two especially or more one or more.
[0013] In this case, generally as low resin of drawdown nature, polyolefine system resin (HM-HDPE, HDPE, LDPE, PP, etc.) is mentioned. Moreover, as for the high resin of drawdown nature, styrene resin (GP, HI, ABS, AS, etc.), polyamide system resin, Denaturation PPE, PC (polycarbonate resin), PET (polyethylene terephthalate resin), PBT (polybutyrene terephthalate resin), PSF (Pori Sall John resin), and PI (polyimide) or these polymer alloy resin, filler strengthening resin, etc. are mentioned. Although what is necessary is just to select suitably from these, if the differences of the value of MFR are what are preferably different from two or more one or more as resin of Ingredients A and B, of course, you may select from the inside of the above-mentioned same group.
[0014] In addition, each thickness of Ingredient A and a B horizon or the ratio of Ingredient A and Ingredient B which constitute a layer, the thickness of the direction of a knockout of parison, or the whole hoop direction, etc. The die of each melting resin path at the time of extruding two or more melting resin as multilayer cylinder-like parison from the die head for co-extrusion blow molding, Although change the lip path clearance of a nozzle part, or the knockout rate of each melting resin is adjusted or being carried out by controlling the injection speed of the melting resin from an accumulator etc. the parison programmer who set up this control itself beforehand according to the appearance of mold goods, and a servo actuator (an oil hydraulic cylinder --) It is desirable to control over a hoop direction and a parison longitudinal direction by using the well-known parison-controller control unit which consisted of units which unified the detector of a servo valve and die path clearance.
[0015] The multilayer parison which carried out this adjustment breaks multilayer parison if needed, and is under descent or in the condition which hung into metal mold. After performing reserve blowing in (PURIBURO) of pressurization Ayr until it becomes the configuration approximated to the profile of the mold goods formed of ******** of metal mold, and the depth of a metal mold cavity the rate metal mold of a Uichi Hidari pair -- inserting -- the mold closure meal 2, for example, 5 - 15 kg/cm, -- after blowing about two 5 - 8 kg/cm pressurization Ayr preferably and carrying out a blow up to a metal mold configuration, it cools. Metal mold can be opened after that and a desired blow molding article can be obtained.
[0016] in order according to this invention approach for Ingredient A to be resin which has high drag force

to expanding at the time of high melt viscosity or melting and to resist strongly to the internal pressure at the time of reserve blowing in (PURIBURO) and the blow up of parison -- expanding -- it is hard to carry out extension deformation. On the other hand, to PURIBURO of parison, or the internal pressure at the time of a blow up, it elongates and is easy for Ingredient B to be the reverse and low melt viscosity or resin which has low drag force to expanding at the time of melting, and to carry out extension deformation of it easily. Therefore, when [for example,] it is made to change according to the extension degree which sets thickness of the whole parison constant and the direction of extrusion (upper and lower sides) of multilayer parison and a hoop direction deform only for the relative ratio of wall thickness to outside diameter of Ingredient A and a B car layer, As a result of the degrees of extension differing partially since each part of parison receives the same pressure unless the interior of parison is divided, a gap will occur in thickness or an expansion space partially, and thick distribution of a blow molding article can be mostly controlled to homogeneity as a whole.

[0017] for example, the degree of extension of a blow molding article in a large field (a part for a corner etc.) Although it is easy to carry out thinning locally in the usual monolayer or the multilayer parison of the fixed ratio of wall thickness to outside diameter If a high-pressure fluid is introduced into the interior and this is expanded after forming the thick fixed parison which was large in the ratio of the layer which consists of the above-mentioned ingredient A in this field, and made the ratio of an ingredient B horizon small The draw ratio of this part is made to fall rather than other parts, it is relatively made heavy-gage, thinning is prevented, and the mold goods of the thick distribution near desired homogeneity are obtained. moreover, the degree of expanding of a blow molding article in a small field (field distant from a part for a corner etc.) Although it is easy to make it heavy-gage locally in the usual monolayer or the multilayer parison of the fixed ratio of wall thickness to outside diameter If a high-pressure fluid is introduced into the interior and this is expanded after forming the multilayer parison adjusted so that it might be small in the ratio of the layer which consists of the above-mentioned ingredient A in this field and might become large about the ratio of an ingredient B horizon The draw ratio of this part will increase rather than other parts, thinning is carried out relatively, heavy-gage-ization is prevented, and the mold goods of the thick distribution near desired homogeneity are obtained.

[0018]

[Embodiment of the Invention] The gestalt of operation of this invention is explained to a detail according to an accompanying drawing below. Drawing 1 is drawing of longitudinal section of the die head part of the accumulator type multilayer blow molding machine used as a gestalt of operation of the first of this invention. In this case, melting resin A and B is supplied to each accumulators 1 and 2 from the extruder which is not illustrated. The above-mentioned ingredient B is aligned with this from the main accumulator 1, and the multilayer parison 3 which injected the above-mentioned ingredient A from the path clearance at the tip of a dice to coincidence, respectively, and joined from the subaccumulator 2 is formed. Under the present circumstances, cascade control of an injection speed or the injection pressure is carried out by the parison program both respectively set up beforehand independently according to the variation rate of the injection pistons 4 and 5, or the die length of parison 3, and the main accumulator 1 and the subaccumulator 2 adjust the rate of flow of ingredients etc. Each ratio of wall thickness to outside diameter of the ingredient A of the multilayer parison 3 and a B horizon is almost determined by the relative difference of the rate of flow of these ingredients in the unification part of the ingredients A and B in the path clearance outlet of a die 6 and a core 7.

[0019] In addition, a core 7 moves by vertical-movement control of the core spindle 9 interlocked with the drive control unit which is not illustrated in the tip of the core mandrel 8, and can carry out modification adjustment of the thickness of the parison 3 in the unification part of a path clearance outlet in the extrusion direction. Moreover, it can fluctuate almost-like [proportionally] to the injection speed of accumulators 1 and 2, or the relative ratio of an injection pressure, and, as a result, the rate of occupying to the total thickness of the layer by Ingredient A or Ingredient B becomes controllable [to 1000:1-1:1000] in the horizontal section of the arbitration of the direction of extrusion (upper and lower sides) of parison.

[0020] Drawing 2 (a) and (b) are outline drawings of longitudinal section showing a situation before and after mold closure carrying out of the multilayer parison 3 extruded from the above-mentioned equipment of drawing 1 between the rate metal mold 10 and 11 of a Uichi Hidari pair and blowing and carrying out

blow molding of pressurization Ayr inside parison. By controlling the ratio of wall thickness to outside diameter of parison 3 so that a part with the high ratio of the above-mentioned ingredient A forms the corner part of the upper and lower sides of mold goods, the result which shows the parison expanding situation in the corner part shown in drawing 3 (a) and (b) is obtained. the homogeneity in which drawing 4 (a) and (b) were formed with the monolayer ingredient of the melt viscosity of about 1 conventional law here -- although the situation of the blow molding method from thick monolayer parison is shown, thinning is carried out, so that it goes to the back in each part of a corner in order to elongate, while the whole carries out thinning as shown in drawing. That is, the ingredient of the part which contacted metal mold once is not elongated any more. For this reason, thinning is carried out, as a later part extends and develops greatly and the timing in contact with a metal mold front face shows drawing 4 (a). Furthermore, the drag force to expanding declines as compared with the part of a thicker large perimeter, and as finally shown in drawing 4 (b), the thinning of the part for a thin-walled part is carried out more.

[0021] On the other hand, as the part of the perimeter, especially Ingredient B show by the arrow head toward [as a result of Ingredient's A showing strong drag force to expanding in the parison part which corresponds to the location, so that it goes to a maximum inner since the ratio of wall thickness to outside diameter of Ingredient A is large and the ratio of wall thickness to outside diameter of Ingredient B is small at a corner as this invention shows to drawing 3 (a)] the back of a corner rather than a corner, it is extended strongly. As a result, finally, like drawing 3 (b), it is eased sharply and thinning serves as almost uniform thickness.

[0022] Drawing 5 is the example which performed reserve blowing in (PURIBURO) in the lower limit section of parison 3 on both sides of the principle same as a gestalt of operation of the second of this invention with pinch equipment 12. Although the profile of the rate metal mold 10 and 11 which forms mold goods is expanded in the core of the longitudinal direction of parison, since parison can be easily introduced also to the part which only this part was expanded greatly, was [a part] easy and extended far back, thinning can be controlled by setting up so that the rate of the ratio of wall thickness to outside diameter of the ingredient B horizon in this location of parison may become large. In this case, by carrying out modification adjustment of the thickness of the parison 3 in the unification part of a path clearance outlet in the extrusion direction by vertical-movement control of the core spindle 9 By setting up thickly in the range which does not extinguish the effectiveness according the thickness of the field equivalent to a part for the parison core greatly expanded by PURIBURO to actuation of the rate of the ratio of wall thickness to outside diameter of Ingredients A and B Thick distribution of the mold-goods approximation parison after PURIBURO can be optimized to homogeneity, and the whole mold goods can be used as the mold goods of more uniform thick distribution.

[0023] Drawing 6 is drawing of longitudinal section of the die head part of the blow molding machine in which the example which in addition to the actuation in the direction of parison extrusion (upper and lower sides) of above-mentioned drawing 5 injects independently the principle same as a gestalt of operation of the third of this invention to arbitration, and sets it as it from the accumulator 2 of right and left of the ratio of wall thickness to outside diameter of the ingredients A and B in the hoop direction of the horizontal section of parison and 2' is shown. Moreover, drawing 7 is the view C-C' sectional view of drawing 6 . Furthermore, drawing 8 and drawing 9 show two examples which multilayer parison extruded from drawing 6 , and fabricate a blow molding article.

[0024] PURIBURO [in the case of drawing 8 / the subaccumulator 2 in drawing 6 , and multilayer parison which injected Ingredient B for the same ingredient A from the main accumulator 1 independently of two places of 2'] first. It becomes possible for the ratio of wall thickness to outside diameter of the arbitration location in a parison hoop direction to be controllable by controlling independently the injection speed of the accumulator 2 which is the classified right-and-left outer layer, and the ingredient A from 2', consequently to change the product thickness in the hoop direction of a horizontal section into arbitration, and to control it by this. In the case of drawing 9 , above-mentioned ingredient A' and another ingredient A to a right-hand side outer layer are arranged to the outer layer on the left-hand side of a drawing, and it uses them as Ingredient B at a inner layer. Consequently, the mold goods which the outer layer quality of the materials of a mold-goods table flesh side differed in drawing 10 , and controlled thickness independently to it as shown as a perspective view in the condition of having cut the central part are obtained.

[0025] Although these are the examples which enabled it to use the ingredient which became independent 180 degrees of circumferencial directions in a parison horizontal section at a time, by adopting die head structure which is indicated by JP,6-155560,A, you may divide in the area of the arbitration of a circumferencial direction, and an include angle, and the number of ingredient classes can also be chosen if needed. although these are examples of a bilayer which consist of an ingredient A and an ingredient B -- these two-layer structure -- in addition, the parison of 3 layer structures which prepared the return layer and glue line of weld flash, or A and B -- a return may be performed in one of layers.

[0026] At least one layer among the ingredients of the layer which constitutes multilayer parison according to this invention High viscosity, Or it forms with the ingredient (ingredient A) which has high drag force to expanding at the time of melting. Other at least one layer as an ingredient configuration which consists of viscosity lower than this or the ingredient (ingredient B) which has lower drag force to expanding at the time of melting In the field equivalent to the part in which mold goods tend to carry out thinning, the thinning which each part of parison is made to generate an expanding gap, and is generated into the corner part of mold goods etc. can be eased by extruding the multilayer parison which made small greatly the ratio of wall thickness to outside diameter of Ingredient B relatively for the ratio of wall thickness to outside diameter of Ingredient A, and performing blow molding.

[0027] In addition, it sets to multilayer parison with the layer by above-mentioned Ingredient A and above-mentioned Ingredient B. When performing PURIBURO and expanding it, the parison which set up the ratio of wall thickness to outside diameter which the total thickness in the location of the knockout (upper and lower sides) of this parison or the arbitration of a hoop direction and an ingredient A horizon, and an ingredient B horizon occupy, and controlled the thick configuration in this way It becomes possible to set the diameter of a parison horizontal section of the location of the arbitration in a longitudinal direction as arbitration, and the optimal diameter of parison for product each cross section can be given. Moreover, since a setup of the configuration approximated to the appearance of the mold goods determined with the edge (****) and the cavity depth of a pinch-off of metal mold and the meant thick distribution is attained, thickness deviation can be eased while being able to decrease the yield of weld flash. Moreover, also in the hoop direction of parison, it is possible to perform a thick setup which amends the thickness deviation by this partial expansion gap by well-known approaches, such as parison control and a die shaving, and it is also possible to operate the horizontal section configuration of parison, not being concerned with the configuration of a product but maintaining thickness at homogeneity mostly.

[0028]

[Effect of the Invention] According to this invention approach explained above, in addition to mold goods with uniform thick distribution being obtained, minimum weight can attain the engine performance of the demanded product, and the yield of weld flash also decreases. moreover, the thing for which the obtained mold goods have uniform thick distribution as compared with the usual blow molding method -- in addition, it is also possible to ease deformation of the mold goods which consider residual stress which thick distribution of each part of a product can be operated without leaving the trace to an exterior like the conventional technique, and the thick distribution according to a product design is acquired, and is generated by the thick gap, and temperature imbalance as a cause. For this reason, minimum weight can attain the engine performance of the demanded product, and since the yield of weld flash also decreases, the blow molding article of high quality can be offered by low cost.

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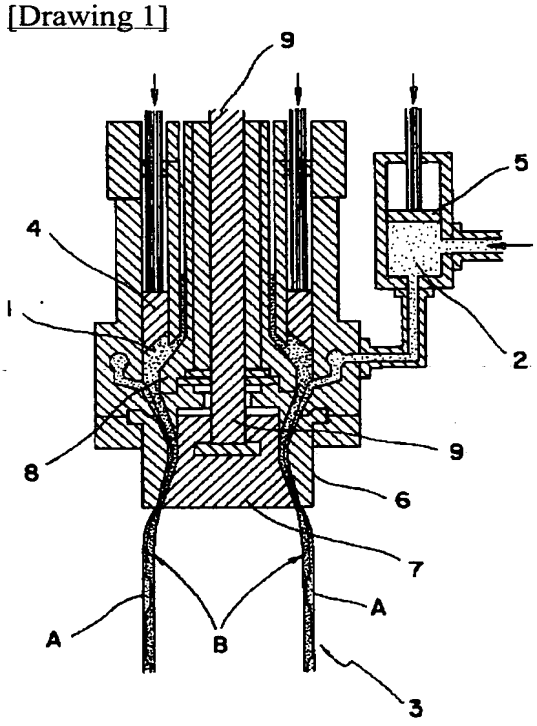
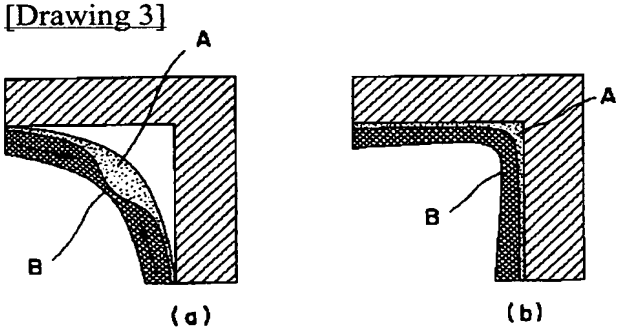
DRAWINGS

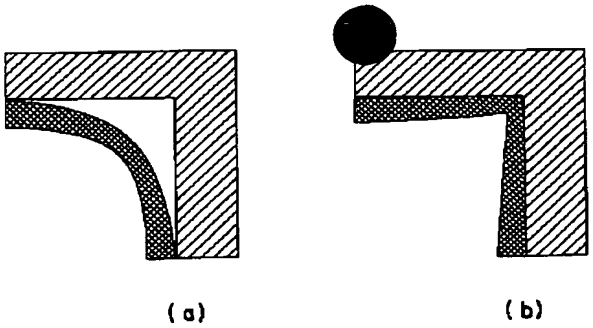
[Drawing 1]



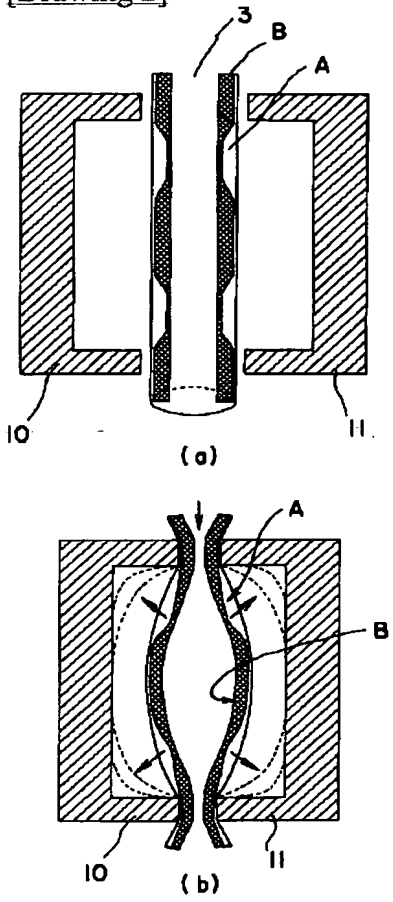
[Drawing 3]



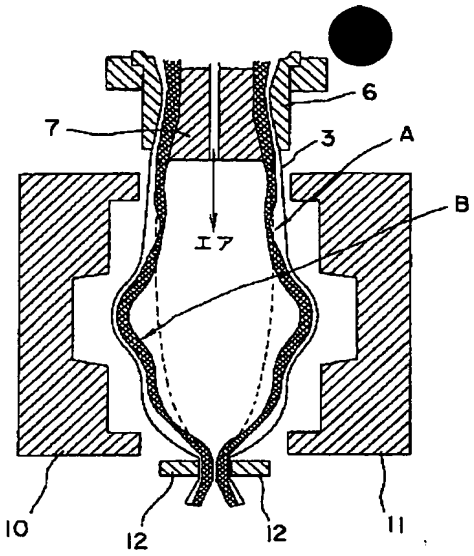
[Drawing 4]



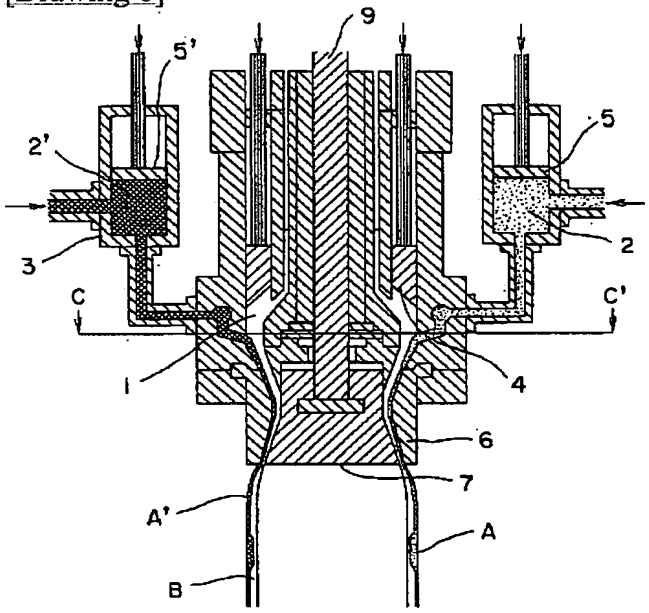
[Drawing 2]



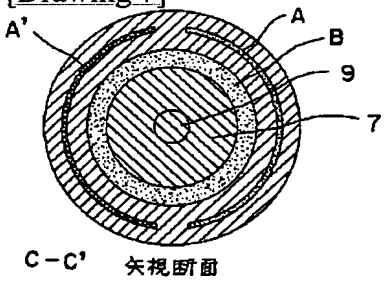
[Drawing 5]



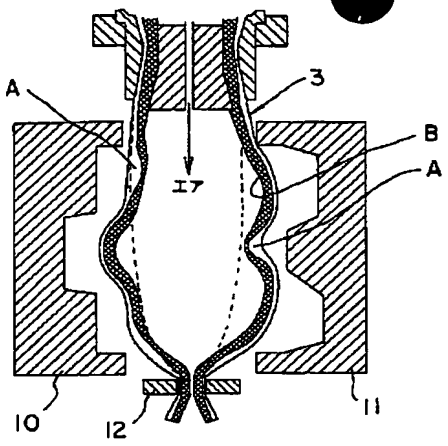
[Drawing 6]



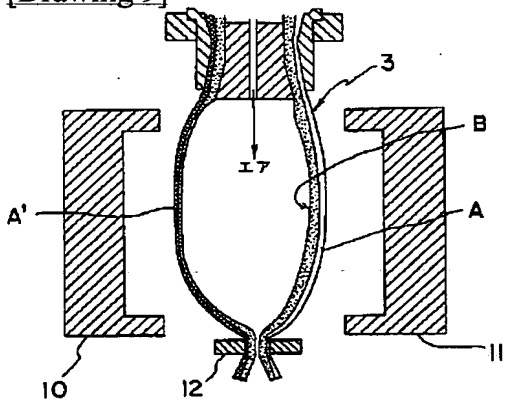
[Drawing 7]



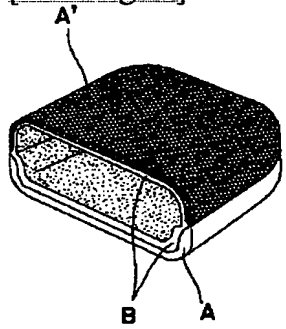
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]